



**A flame monitoring apparatus**

**Patent number:** DE19649264  
**Publication date:** 1998-06-10  
**Inventor:** WINTRICH FRANZ DIPL ING (DE)  
**Applicant:** BFI AUTOMATION GMBH (DE)  
**Classification:**  
- international: F23M11/04; F23N5/24  
- european: F23M11/04C; F23N5/08B  
**Application number:** DE19961049264 19961128  
**Priority number(s):** DE19961049264 19961128

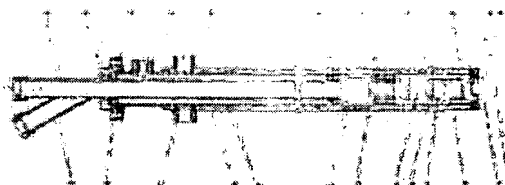
Also published as:

 EP0845636 (A2)  
 EP0845636 (A3)

[Report a data error here](#)

Abstract not available for DE19649264  
Abstract of corresponding document: EP0845636

An apparatus for monitoring a flame is disclosed. It comprises a video camera (16) looking in flame direction and a plurality of light guide fibers observing the flame surroundings. These optical elements are mounted in a lance including a double-walled pipe (26,28) through which cooling water flows.



Data supplied from the esp@cenet database - Worldwide

the recesses 48 and from there through the associated opening 54 into the other half of the annular space. No sealing is provided between intermediate flange 24 and the end edges of separating walls 56 as a small leakage at this site is tolerable.

As may be seen in Fig. 1 a light guide holder 60 is fastened, preferably clamped on the tubus 14 of video camera 16; in Fig. 2 holder 60 is shown axially offset for sake of clarity. Holder 60 comprises clamp body 62 and two light guide carriers 64, 64 mounted thereon e.g. by means of screws. Each light guide carrier is L-shaped and provided with throughbores 68 each receiving a light guide, for example a glass fiber which is held preferably by clamp means, not shown. The light inlet ends of the light guides are disposed such that their axes extend in the central plane of notches 44, 46 and the axes are directed such that the light guides cover a large angle of preferably 90° but at least 75°. If each light guide has an aperture angle of, say, 20° five or four light guides, respectively, will be necessary. Fig. 4 illustrates such a light guide carrier in partial section view.

Fig. 3 shows the video camera 16 and its tubus 14 and socket 70, the latter being held in a camera mount 72. The latter is tripod shaped, the legs thereof being in heat-conducting abutment on the inner tube 26 of the heat sink tube. The light guides extend through the interstices between the legs. Each leg of the mount is connected, by means of a bolt 74, to support tripod 76 which has in its center a through-hole provided with nut screw threads 78 for connecting it to the end of the support tube. The support tripod 76, too, is in heat conducting abutment with inner tube 26 of the heat sink tube. The light guides extend from their carriers into the support tube. At its end facing away from the flame the support tube has a branch 80 through which the light guides extend e.g. to spectroscopes while the camera cable extends through the support tube itself.

#### Claims

1. An apparatus for optically monitoring a flame, comprising:
  - a lance having a first end and a second end, said first end being adapted to be mounted on a furnace wall,
  - a support module disposed in said lance adjacent said first lance end,
  - a video camera supported by said module and directed towards a flame in a furnace,
  - light guide fibers having light inlet ends, said light inlet ends being mounted in said module and directed towards flame surroundings.
2. The apparatus of claim 1, further comprising a support tube, said module being fixed to said support tube, a video-camera cable extending through said support tube, and said light guide fibers extending through said support tube.
3. The apparatus of claim 1, further comprising a heat sink member housing said module.
4. The apparatus of claim 3, further comprising a twin-walled heat sink tube, said heat sink member being disposed adjacent an end of said heat sink tube, and cooling liquid flowing through said heat sink tube.
5. The apparatus of claim 4, further comprising at least two separating walls extending between an inner wall and an outer wall of said heat sink tube thereby defining an inflow string and a drain string.
6. The apparatus of claim 5 wherein said heat sink member has at least one recess, each recess connecting an inflow string to a drain string.
7. The apparatus of claim 3, further comprising a protective disk mounted on said heat sink member.
8. The apparatus of claim 3 wherein said heat sink member has notches through which light may impinge on said light inlet ends.
9. The apparatus of 8, further comprising a protective disk mounted on said heat sink member and having slots aligned with said heat sink member notches.
10. The apparatus of claim 1 wherein said video camera has a tubus and said module comprises:
  - a video camera mount,
  - a support block mounted on said video camera tubus,
  - at least one light guide fiber carrier fixed to said support block and having bores receiving individual light guide fibers.
11. The apparatus of claim 10 wherein said bores are disposed in a common plane but angularly offset to one another.
12. The apparatus of claim 11, further comprising a heat sink member surrounding said module and having notches, a protective disk mounted on said heat sink member and having slots aligned with said notches, and said bores having axes extending in a common central plane of said slots and notches.
13. The apparatus of claim 10 wherein said video camera mount defines openings, and said light guide fibers extending through said openings.

14. The apparatus of claim 13 wherein said video camera mount is tripod shaped.
15. The apparatus of claim 13, further comprising a support tube, a tripod member screwed to said support tube, and bolts connecting said video camera mount to said tripod member. 5
16. The apparatus of claim 15 wherein said support tube is centered within a heat sink tube by means of said tripod member. 10
17. The apparatus of claim 16 wherein said support tube and said heat sink tube define an annular space adapted to be supplied with pressurized air. 15
18. The apparatus of claim 11 comprising two fiber carriers, the bores of said fiber carriers commonly defining a sight angle of at least 150°, preferably 165°, and more preferably 180°. 20

25

30

35

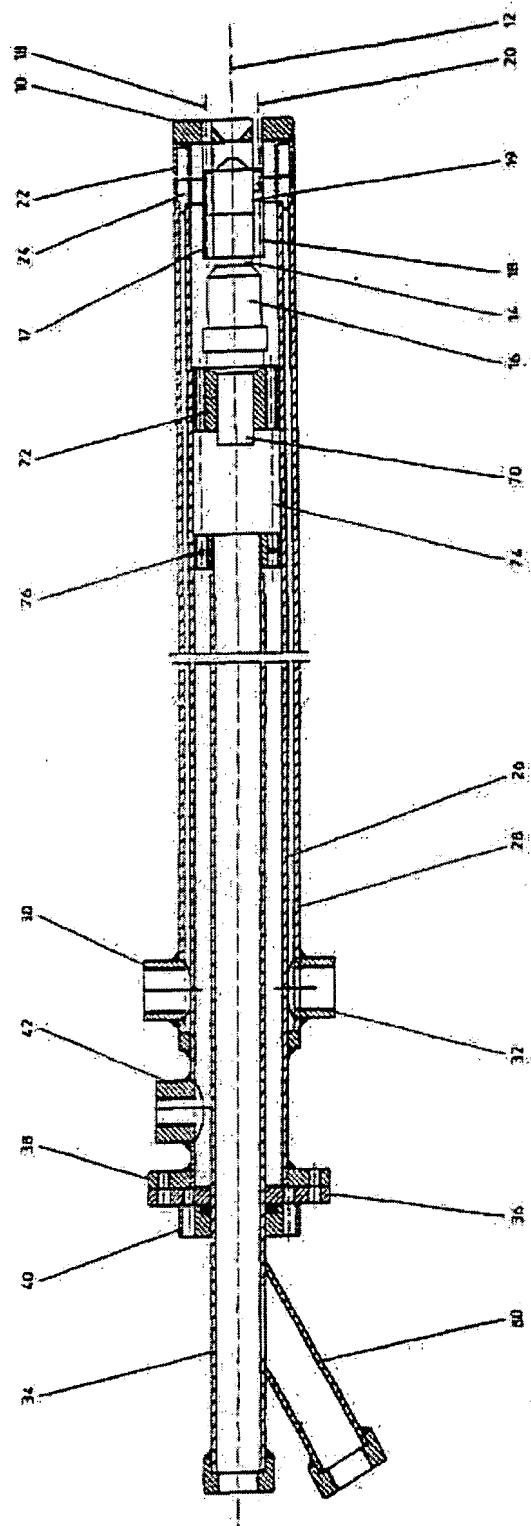
40

45

50

55

4



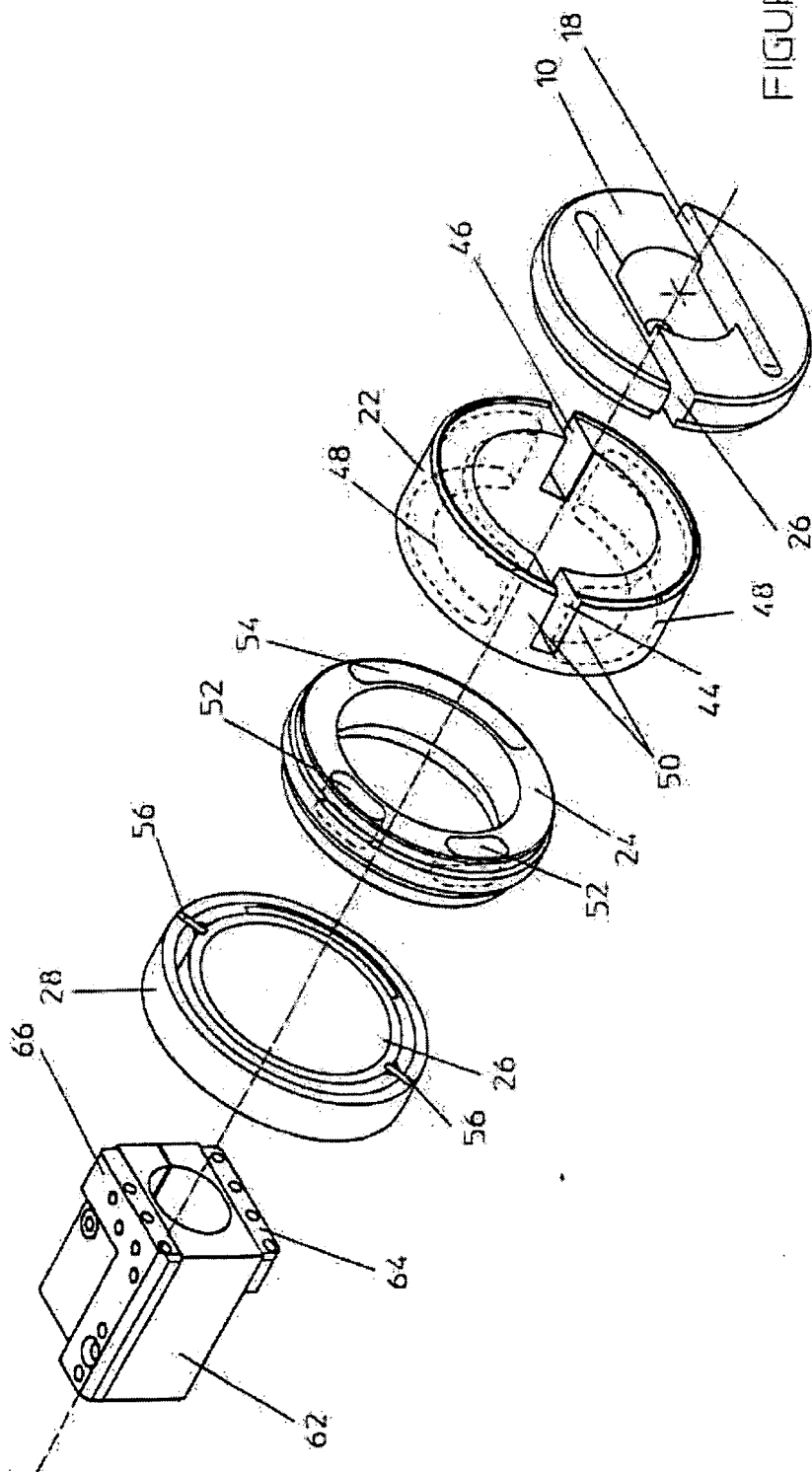
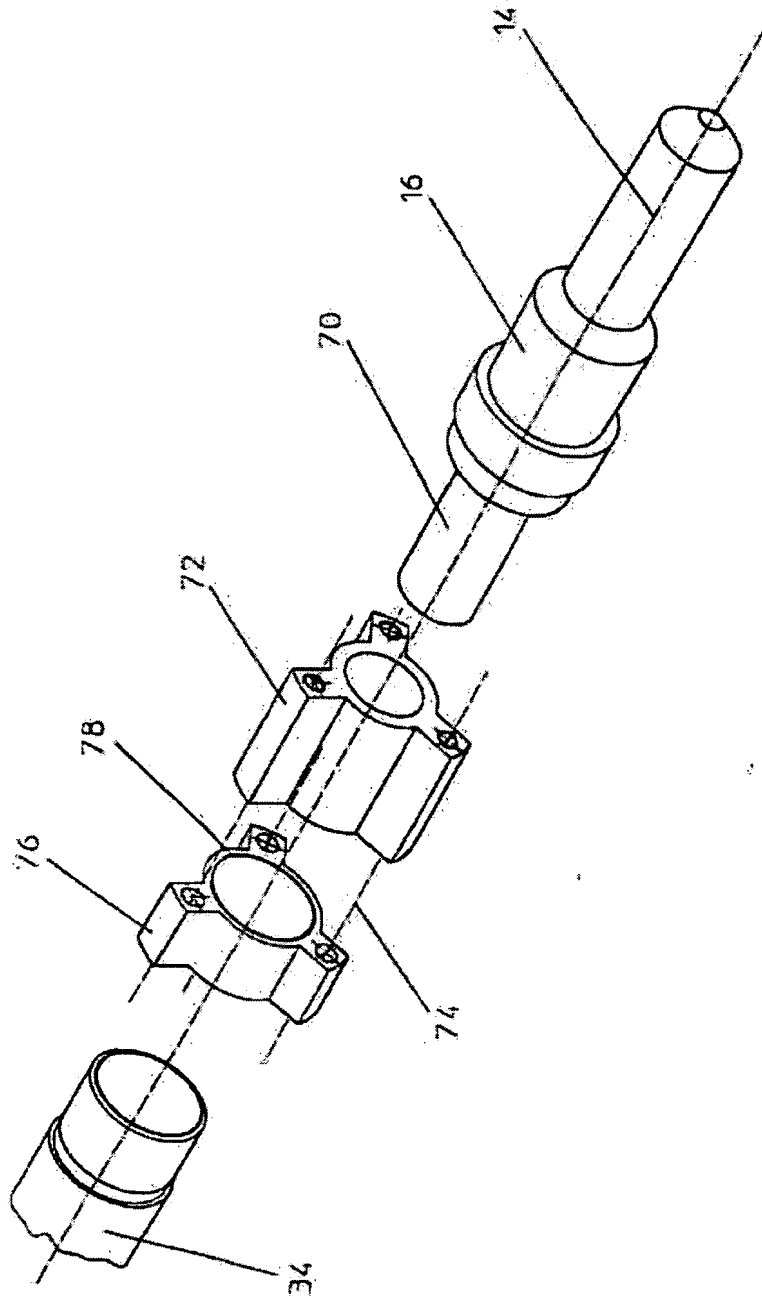
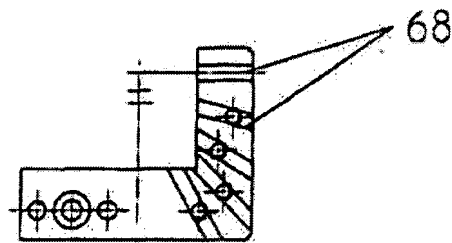


FIGURE 2



FIGUR 3



FIGUR 4